PROJECT REPORT

Team ID	PNT2022TMID38800
Project Name	IoT Based Safety Gadget for Child Safety Monitoring & Notification

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Abstract:

The children are less secure nowadays and have many issues concerning their security purpose. Many Family members spent more time in work and social accountability where they need to take care of their children. The current status in our country is not habitable for monitoring children. With the absence of a child monitoring system, it is hard to monitor the children every seconds. Where Under age children may be impulsive in the way they act and in places to be. Most of the human behaviour are shaped in their childhood stage, In order to get this behaviour child monitoring system is necessary. Children are prone to many incidents and accidents. The safety of children is very indispensable as children cannot protect themselves.

The main aim of this project is to create a smart wearable device for children that uses refined technology to assure their safety. The paper provides a smart solution for deflecting losing kids while going out alone or with their parents based on the Internet of Things(IOT). Our proposed system will ensures utmost security and ensure live tracking for kids. It proposes a model for child safety through smartphones that can track their children's location and provide the precise coordinates of the child's location in real-time Anywhere by monitoring the activities, the security state of the children are examined.

1. INTRODUCTION

The Internet of Things (IoT) plays a vital role in day-today life. The Internet of Things is increasingly finding a place at the heart of many business automation strategies. Companies are using sensors in the logistics chain to help them track where delivery is with extraordinary accuracy. The motivation for this wearable comes from the increasing need for safety for little children in contemporary times as there could be scenarios of the child getting a drift in a major crowded sector. This paper focuses on the key aspect that a missing child can be assisted by the people around the child and can play a remarkable role in the child's safety until reunited with the parents. If any deviant readings are disclosed by the sensor, then an SMS and phone calls are set off to the parent's mobile. Also, it overhauls the parental app through the cloud. The technique is equipped with GSM and GPS modules for sending and receiving calls, and SMS between the safety gadget and the parental phones. The system also consists of a Wi-Fi/cellular data module used to implement IoT and send all the monitored parameters to the cloud for android app monitoring on the parental phones.

The panic alert system is used during panic situations alert are sent to the parental phone, seeking help also the alert parameters are updated to the cloud. Most of the wearables available today are focused on providing the location, and activity of the child to the parents.

2.LITERATURE SURVEY:

S.NO	TITLE	YEAR	TECHNIQUE USED	ADVANTAGES	DISADVANTAGES
1	Real-Time Child Abuse and Reporting System	2020	GPS Tracker	This makes guardians defend youngsters even in their nonattendance.	The child could not produce the exact alert command during a panic condition.
2	Smart IoT Device for Child Safety and Tracking	2019	Link-It ONE board	The parameters such as touch, temperature & heartbeat of the child are used for parametric analysis and results are plotted for the same.	To implement the IoT device which ensures the complete solution for child safety problems.
3	Child safety wearable device	2017	Wi-Fi and Bluetooth	It can be used in any phone and it is not necessary that an expensive smartphone is required.	Device's battery gives short life-time.
4	Child Safety & Tracking Management System by using GPS	2016	Children is able to send a quick message and its current location via Short Message services.	The advantages of smart phones which offers rich features like Google maps, GPS, SMS etc.	This system is unable to sense human behaviour of Child.

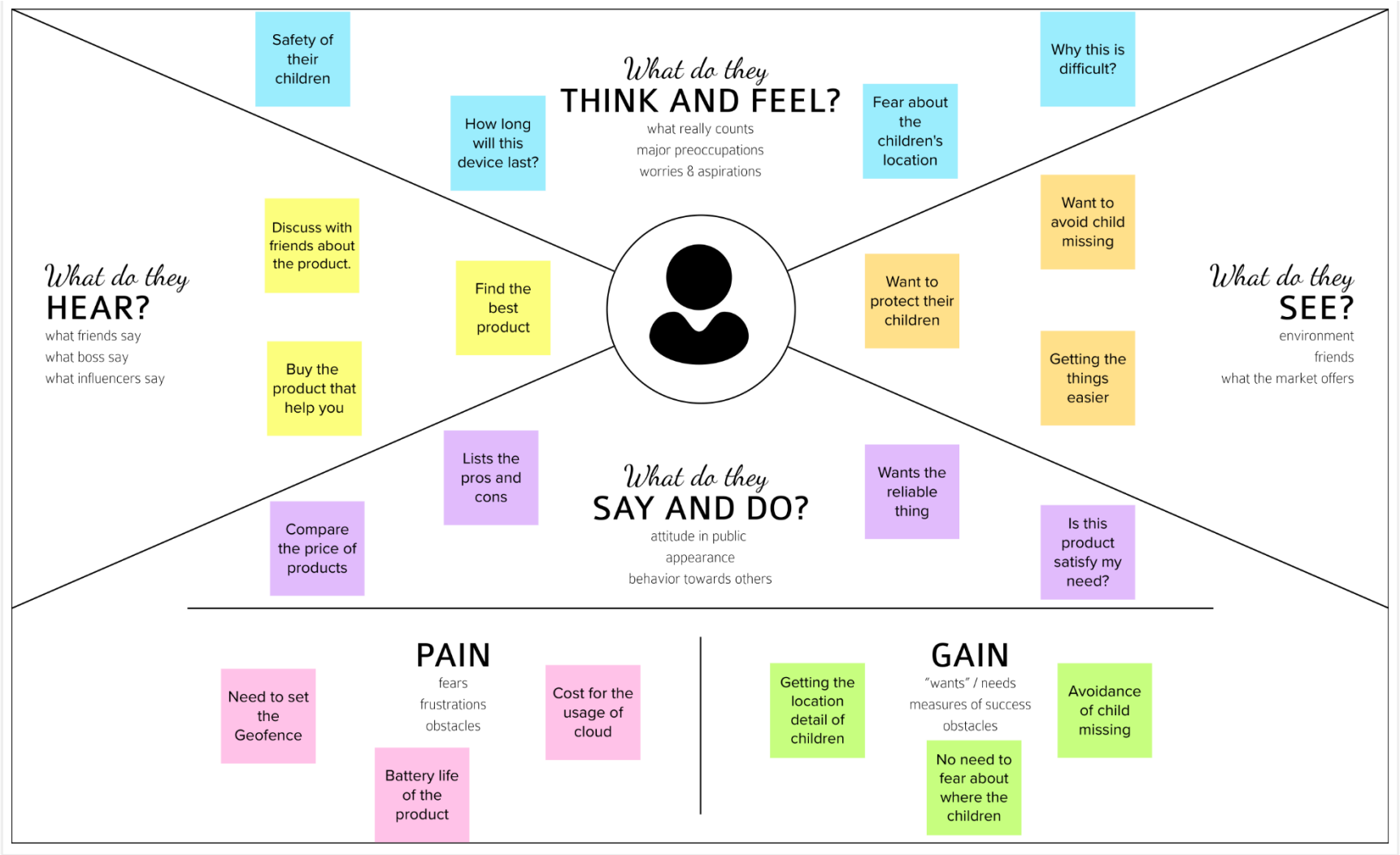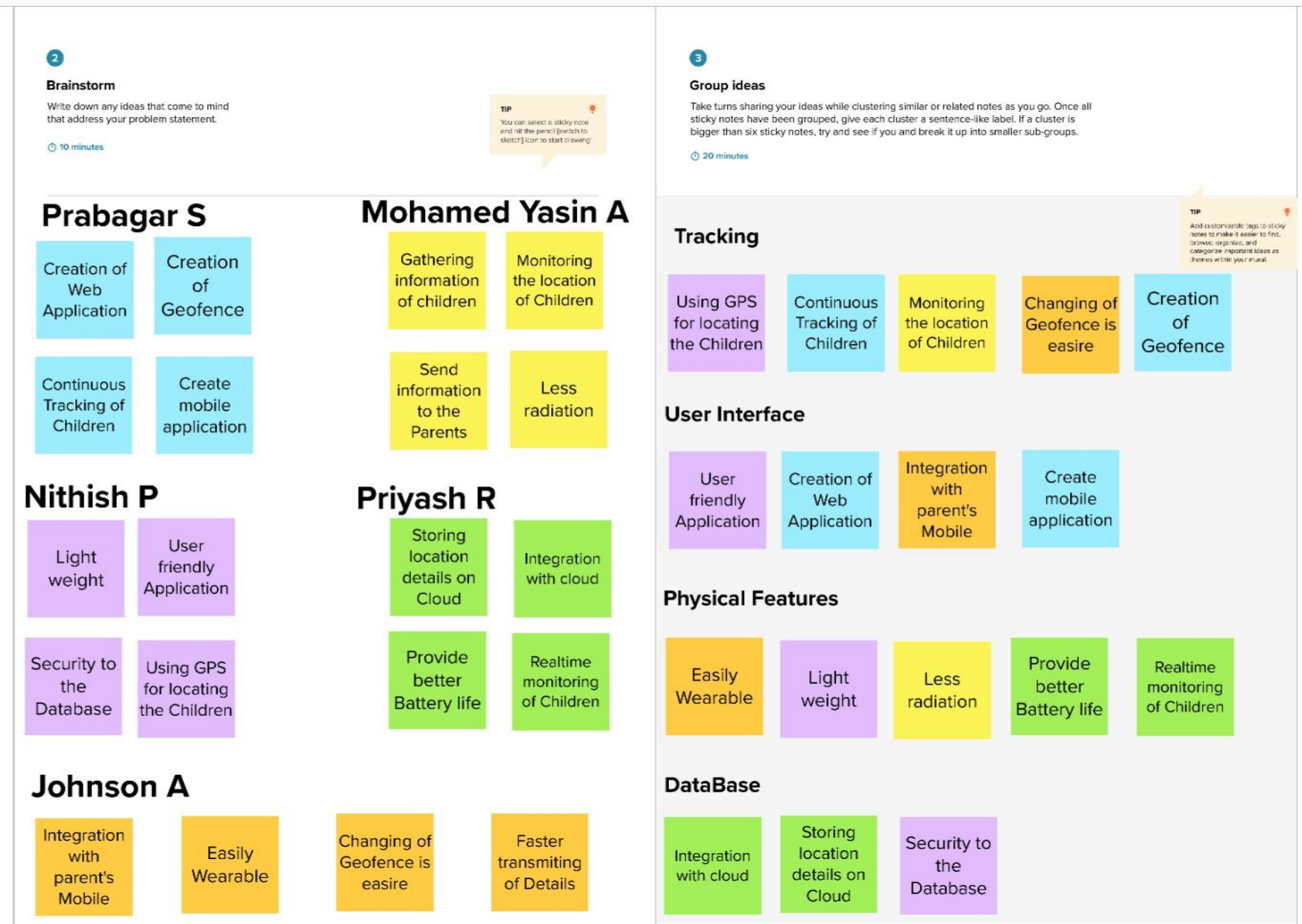| 5	Children Location Monitoring on Google Maps Using GPS and GSM.	2016	GSM module	A child tracking system using android terminal.	This device cannot be used in rural areas.

PROBLEM STATEMENT:

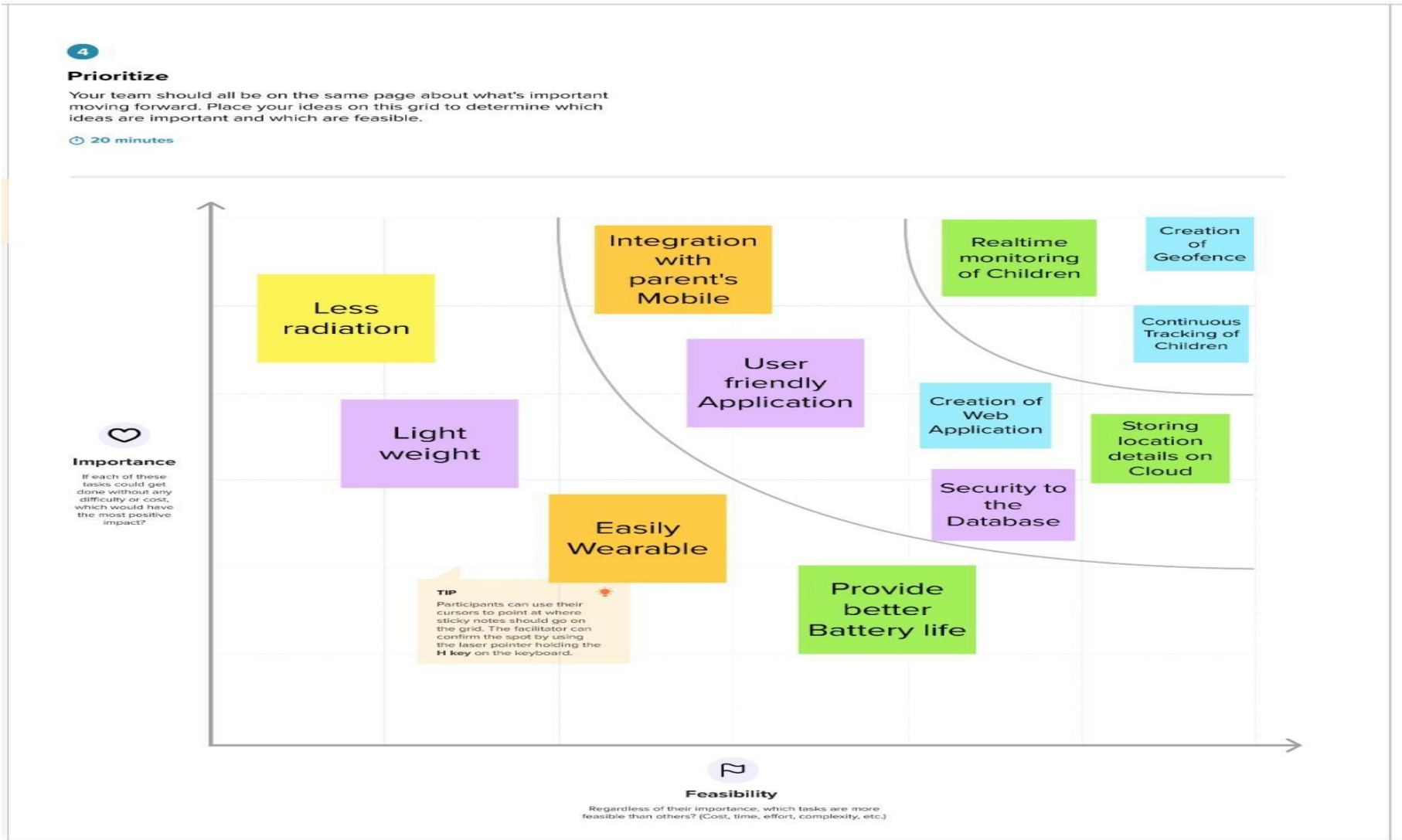| Problem Statement (PS)	I am (Customer)	I am trying to	But	Because	Which makes me feel
PS-1	Parent	Locate and monitor my children remotely	I don't have any device for monitoring	To continuously monitor them	Satisfied.
PS-2	Parent	Ensure my children location for their safety	It requires a device for the purpose	To continuously monitoring them	Safety about my children.

3.IDEATION & PROPOSED SOLUTION:

EMPATHY MAP CANVAS:

BRAINSTORMING:

IDEA PRIORITATION:

PROPOSED SOLUTUION:

S. No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Children missing is one of the worries for the parents. Child abductors are continually abducting the children from parents/legally appointed guardians to get the ransom/money for their benefit. more measures must be taken to protect children against abduction and its impacts.
2.	Idea / Solution description	In this project, we are going to develop a wearable safety gadget to display the live location of a children at any time on the parent's mobile to set the seal on their safety. The application is to track down the children when they're within Bluetooth range, also functions when the kids go farther afield. Its competence as a tracker is outstanding if you live in densely populated areas like cities or big towns.

It is useful for parents to locate their children. |
| 3. | Novelty / Uniqueness | The system software involuntarily alerts the parent/guardian by redirecting a text Message. Contrary to other devices, it has plenty of characteristics like the development of sensors technology, availability of internet-connected devices and the data analysis algorithms making IOT devices act smart in emergencies without human intervention. |

4.	Social Impact / Customer Satisfaction	The parent can keep their children Secure with tension-free minded when they are away from them. Precisely predicting the circumstances of the children and swiftly sensing the problems around children will make parents at ease. It will be great helpful to parents who are busy workers not having time to watch over their children, and easy to operate so anyone can handle it.
5.	Business Model (Revenue Model)	In this contemporary market, this would be desired as kids need more protection in the current times. The gadget can be acquired at an affordable rate.
6.	Scalability of the Solution	This solution could be further enhanced by the installation of the mini camera inside a smart gadget for exemplary security and protection so that a glimpse can be caught on the live footage on the parental phone during panic circumstances.

PROBLEM SOLUTION FIT:

Define CS, fit into C

1. CUSTOMER SEGMENT(S) `CS`

In our system, we automatically monitor the child in real time using Internet of Things, with the help of GPS, GSM, and Raspberry Pi. This system requires network connectivity, satellite communication, and high-speed data connection when we use web camera and GPS to lively monitor.

6. CUSTOMER CONSTRAINTS `CC`

In this system, the collected values from every sensor like temperature sensor, pulse rate detection sensor, metal detection sensor, and the location value from GPS are used to detect the status of the child and alerts the respective guardians using GSM accordingly.

5. AVAILABLE SOLUTIONS `AS`

Our proposed system consists of Raspberry Pi microprocessor in which all other sensors, GPS and GSM are integrated. The users are required to register using their credentials to use the application. The device will be given to the children for monitoring them regularly. We will feed the boundary value while writing code for the system and we control it using GPS for that device which is also known as Geo Fencing. These data are stored in the server.

Explore AS, differe

Focus on J&P, tap into BE,

2. JOBS-TO-BE-DONE / PROBLEMS `J&P`

The child safety wearable device can act as a smart device. It provides parents with the real-time location, surrounding temperature, SOS light along with Distress alarm buzzer for their child's surroundings and the ability to locate their child or alert bystanders in acting to rescue or comfort the child.

9. PROBLEM ROOT CAUSE `RC`

· Parents Cannot access contact information of child.

· Children runs away from target place.

7. BEHAVIOUR `BE`

In our system, we automatically monitor the child in real time using Internet of Things, with the help of GPS, GSM, and Raspberry Pi. This system requires network connectivity, satellite communication, and high-speed data connection when we use web camera and GPS to lively monitor.

Identify strong TR&E

3. TRIGGERS `TR`

Basically, children cannot complain about abasements which they face in their daily life to their parents. They can't even realize what actually happens to them at their age. It is also difficult for parents to identify their children are being abused.

4. EMOTIONS: BEFORE / AFTER `EM`

Before: Prevent children before being attacked, an autonomous real-time monitoring system is necessary for every child out there.

After: Increased the level of confidence and feel secured

10. YOUR SOLUTION `SL`

A portable device which will have a pressure switch. As soon as the person senses any insecurity from a stranger, he/she can then put pressure on the device by squeezing or compressing it. Instantly the pressure sensor senses this pressure and a conventional SMS, with the victim's location will be sent to their parents/guardian cell phone numbers stored in the device while purchasing it, followed by a call.

8. CHANNELS of BEHAVIOUR `CH`

8.1 ONLINE

Promoting through social media. With the help of social media entrepreneurs/influencer.

8.2 OFFLINE

Newspaper advertisements.

4.REQUIREMENTS ANALYSIS:

FUNCTIONAL REQUIREMENTS:

S. No.	Functional Requirements	Description
FR-1	User Interface	It should be the connector between the various systems or between other part or unit of the system.
FR-2	Notification System	Parents want to be notified when their child is too far away from them.
FR-3	Secure personal information/Privacy	Encryption of data, any personal data should be deleted as soon as the child is found by the parents; alternatively, interviewees suggested data may be stored for up to 24hrs.
FR-4	Local Ranging/Positioning	GPS is a common and available technology; however, it is unreliable and should not be expected to work for indoor applications.
FR-5	Voice Navigation	Interviewees prefer to be guided by either voice or map navigation. Generally, a map was preferred however two users preferred a car-like voice navigation.

NON-FUNCTIONAL REQUIREMENTS:

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	How easy is it for a customer to use the system?
NFR-2	Security	How well are the system and its data protected against attacks?
NFR-3	Reliability	How often does the system experience critical failure? e.g.: the system must perform without failure in 95 percent of use case.
NFR-4	Performance	How fast does the system return results?
NFR-5	Availability	How is the user availability time compared to downtime?
NFR-6	Scalability	How much will this performance change with higher workloads?

5.PROJECT DESIGN:

DATA FLOW DIAGRAM:
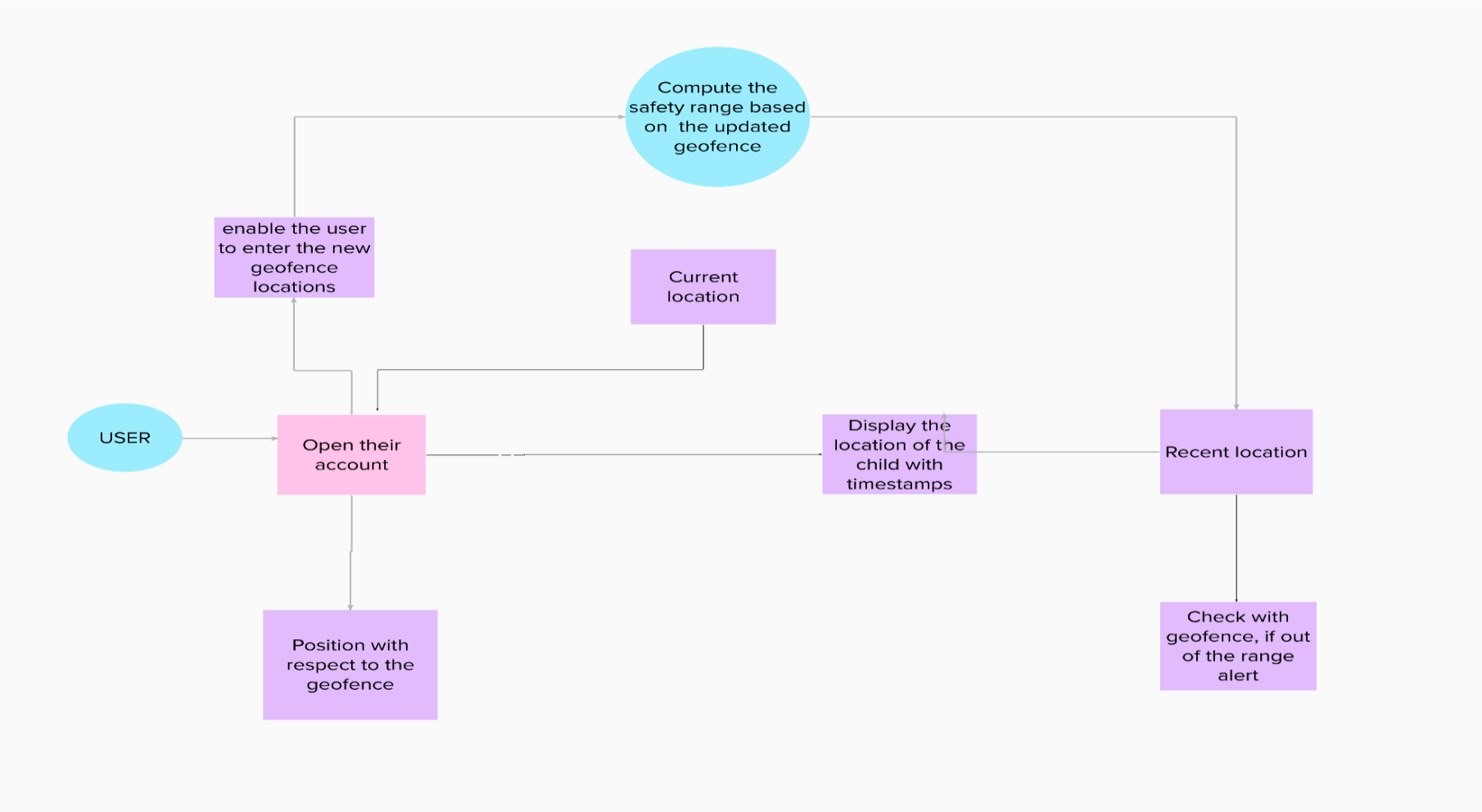
USER STORIES:

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the application through Google Account	I can register & access the dashboard with Google account Login	Low	Sprint-2
	Login	USN-4		As a user, I can log into the application by entering email & password	High	Sprint-1
Customer Care Executive	Login		As I enter, I can view the working of the application and scan for any glitches and monitor the operation	I can login only with my provided credentials.	Medium	Sprint-3

		and check if all the users are authorized.			
Administrator	Login	Maintaining and making sure the database containing the locations are secure and accurate and updated constantly.	I can login only with my provided credentials.	High	Sprint-3

TECHNOLOGY ARCHITECTURE:
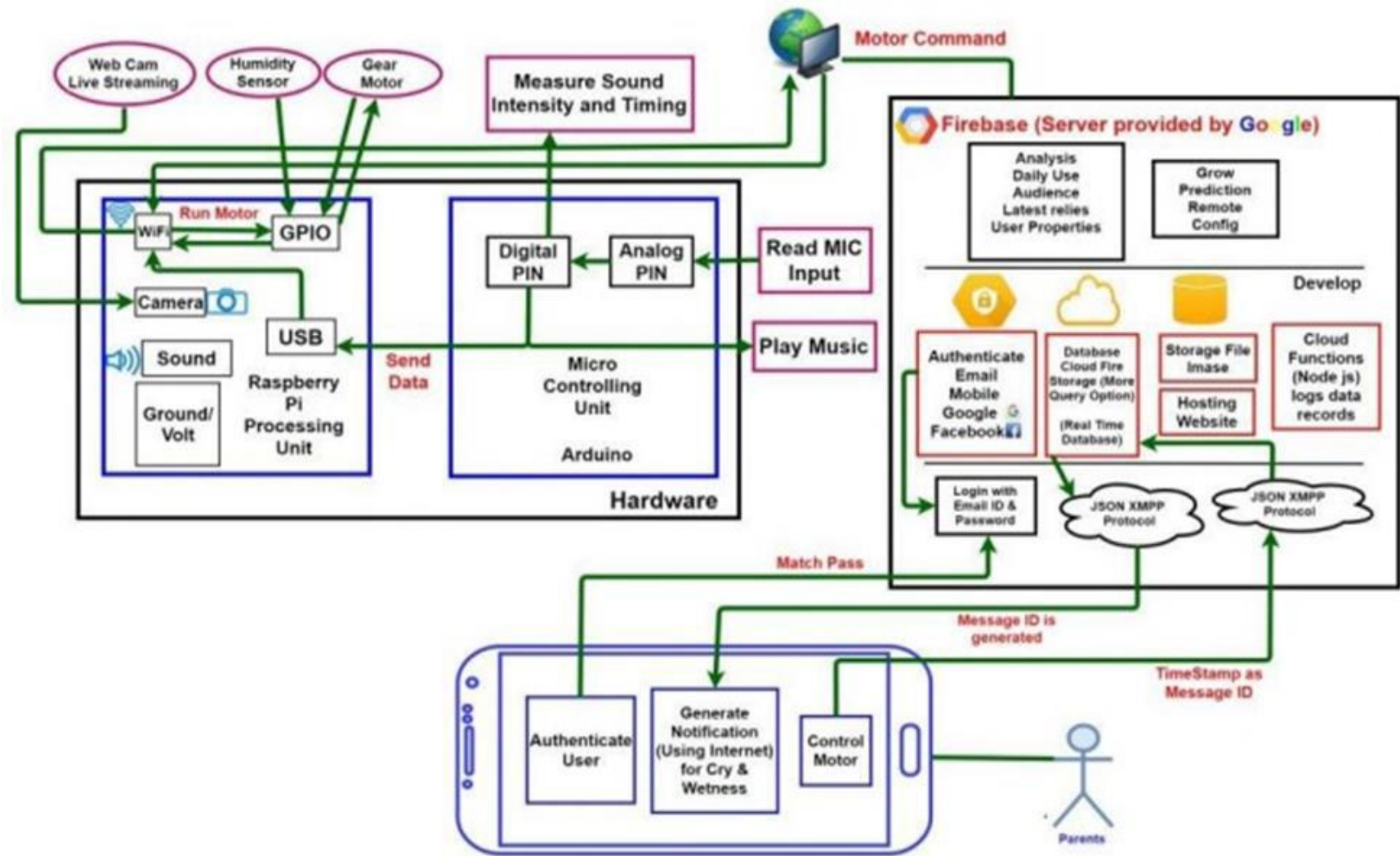
6.PROJECT PLANNING

SPRINT DELIVERY PLANNING:

Sprint	Functional Requireme nt(Epic)	User Story Number	User Story / Task	Story Point s	Priority	Team Members
Sprint-1	Designing IoT kit	USN-1	Setting up the IoT device	2	High	Prabagar S, Nithish P,Mohamed Yasin A
	Getting Coordinat es	USN-2	Adding GPS in it and getting Latitudeand Longitude	1	High	Prabagar S, Johnson A,Priyash R
Sprint-2	Watson IoT Platform	USN-1	Connect the device with WatsonPlatform	2	High	Prabagar S, Johnson A
	NodeRed	USN-2	Write the flow for IoT using Node Red	2	High	Prabagar S, Priyash R,Mohamed Yasin A
	IBM cloud	USN-3	Store Location in IBM cloud	2	Medium	Prabagar S, Johnson A,Priyash R

Sprint-3	Register/Login	USN-1	Creating a web UI	1	High	Prabagar S, Nithish P,Mohamed Yasin A
	Dashboard	USN-2	Prepare a dashboard to see the currentLocation	2	High	Prabagar S, Johnson A,Nithish P
Sprint-4	Geofence	USN-1	Create an option to make a geofence	2	High	Prabagar S, Nithish P,Priyash R
	Send Notification	USN-2	Send notification to the user	2	High	Prabagar S, Priyash R

SPRINT-1:

Python Program to send the data to IBM cloud:

```
import json
import collections.abc
import wiotp.sdk.device
import time
myConfig = {
  "identity" : {
    "orgId" :"s2m7ix",
    "typeId" : "Child_Tracker",
    "deviceId" : "Child_Tracker123"},
  "auth":{
    "token":"Child_Tracker123"
    }
}
```

```python
client = wiotp.sdk.device.DeviceClient(config=myConfig ,logHandlers=None)
client.connect()
while True:
    name = "Child"
    #child is in park
    latitude = 11.56245
    longitude =   79.59692
    #child is outside  11.560738230656101, 79.59760827051736
    #latitude =  11.560738
    #longitude =  79.597608

    myData = {'name':name,'lat' :latitude, 'lon':longitude}
    client.publishEvent(eventId="status",msgFormat="json",data=myData,qos=0,onPublish=None)
    print("Data published to IBM IoT platform : ",myData)
    time.sleep(20)
client.disconnect()
```
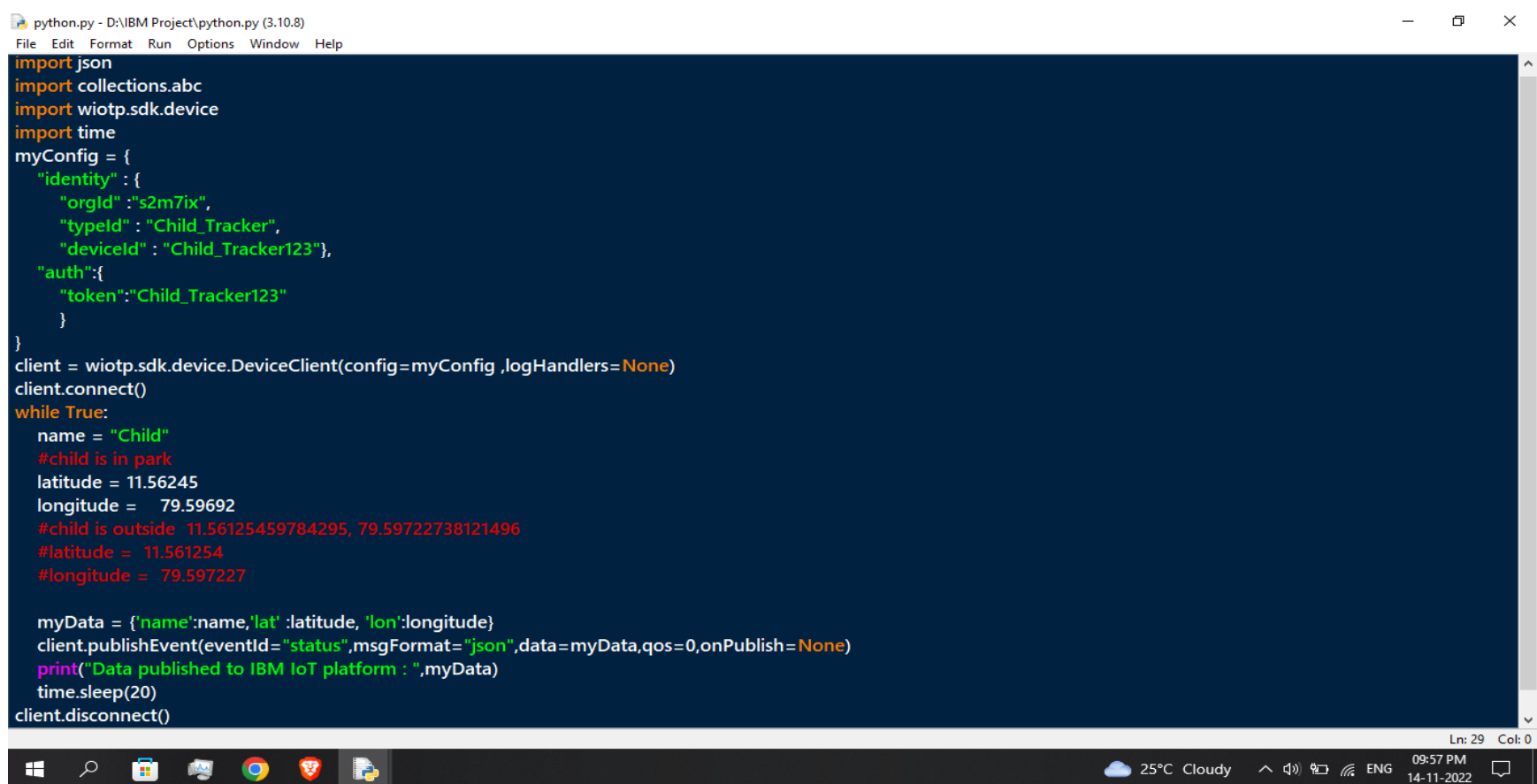
OUTPUT:

SPRINT-2:

Creating Node-Red web application:

1.Node-Red Connection
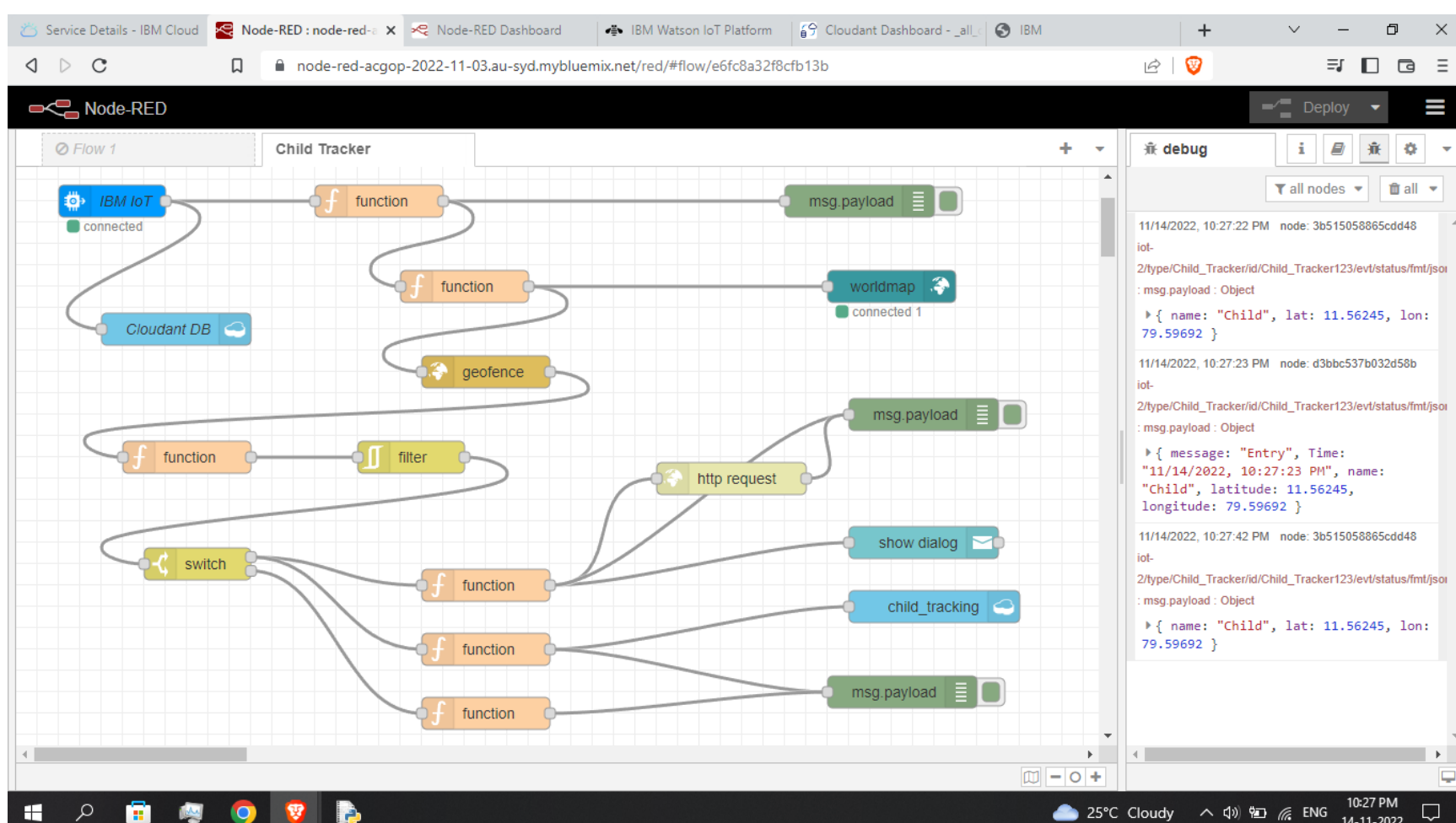
2.Dashboard to see the location of the child
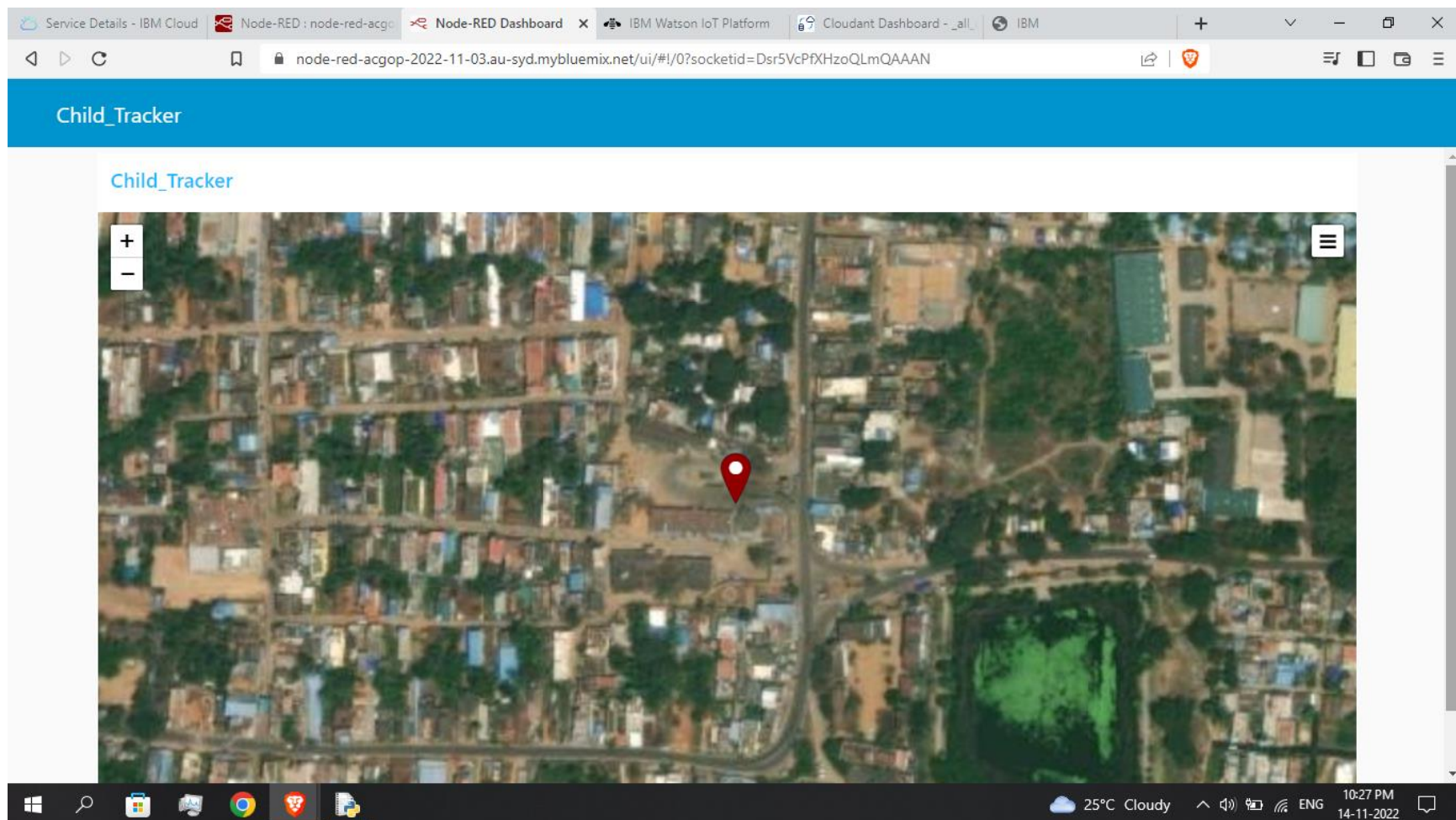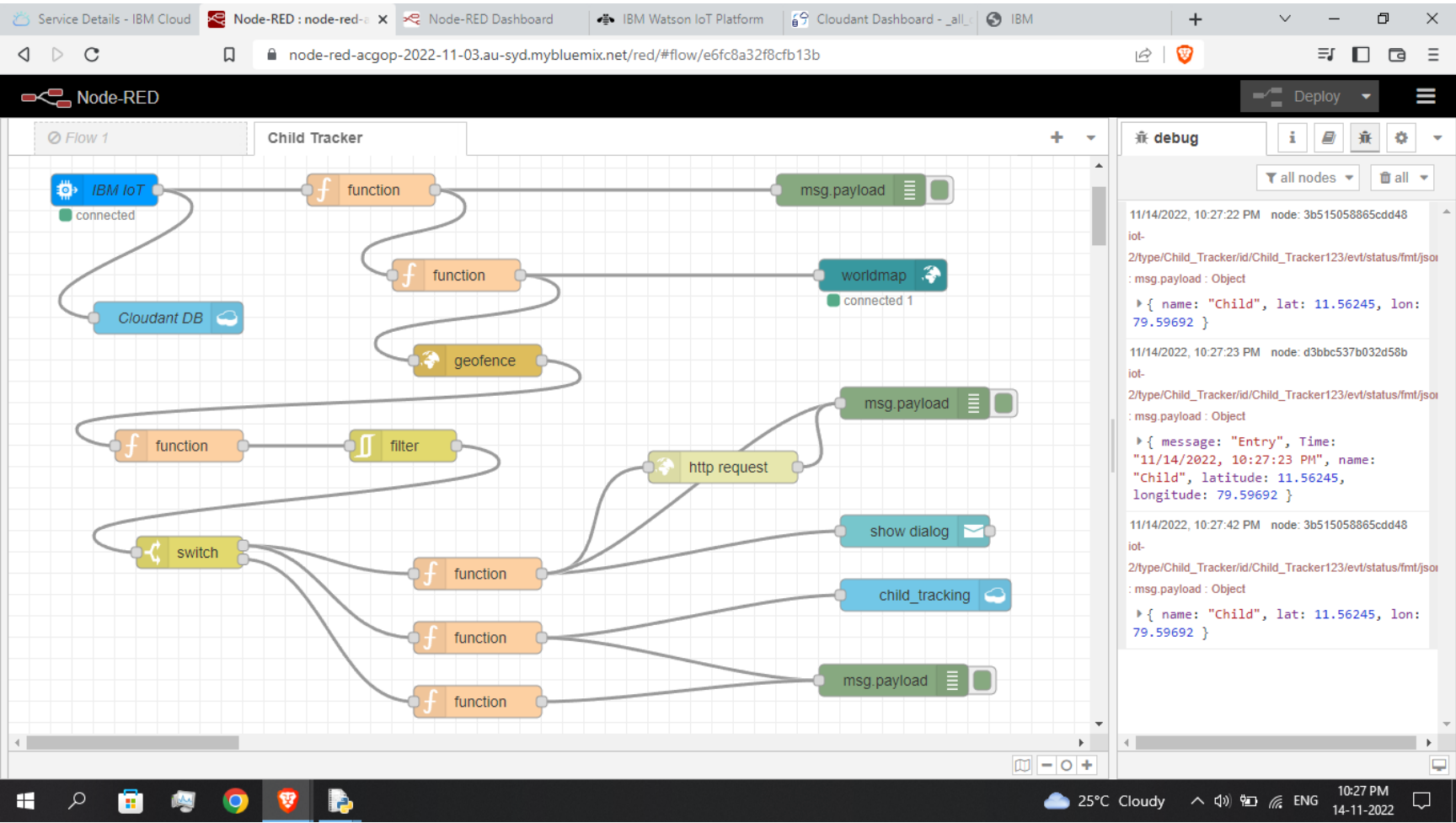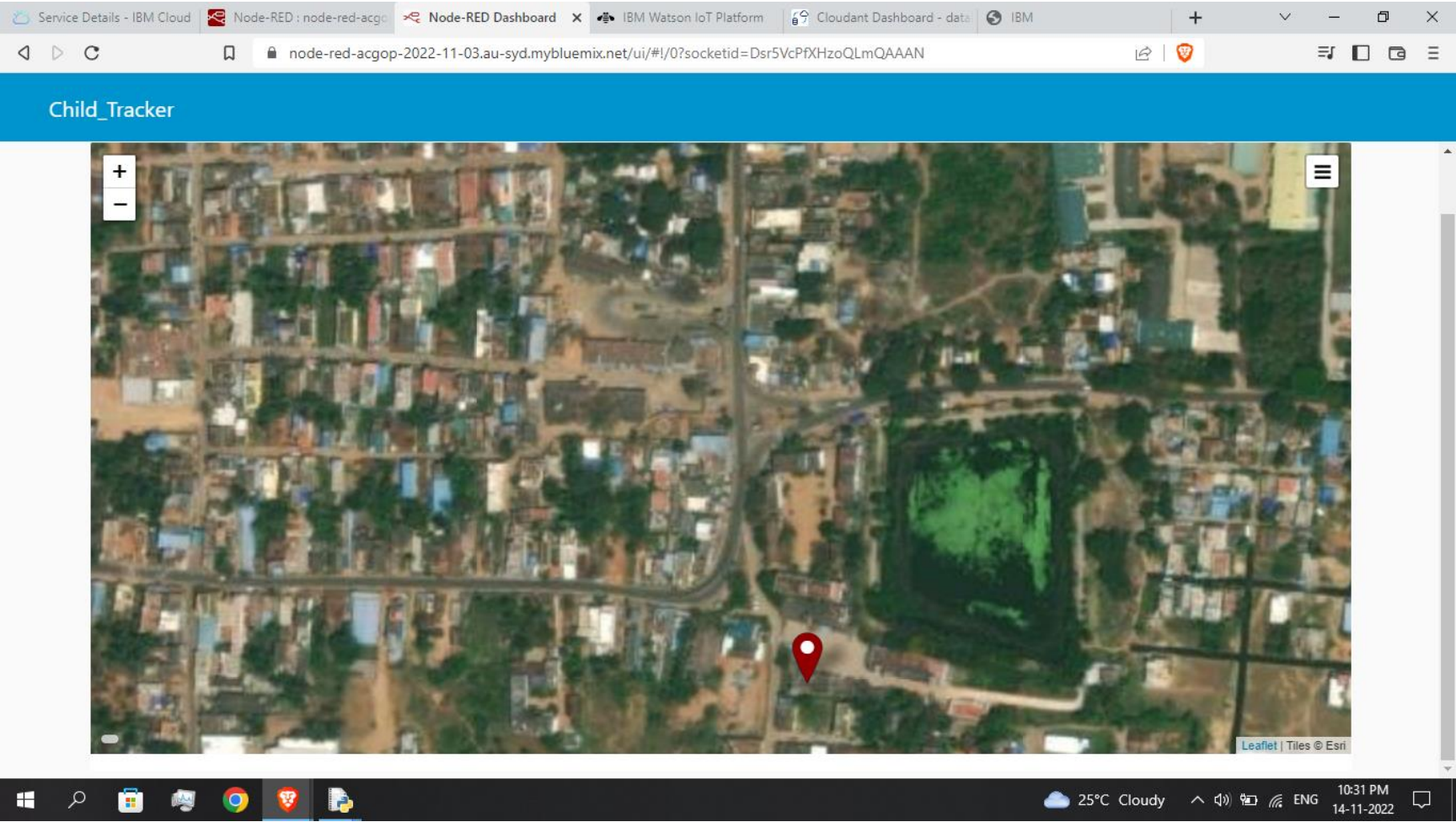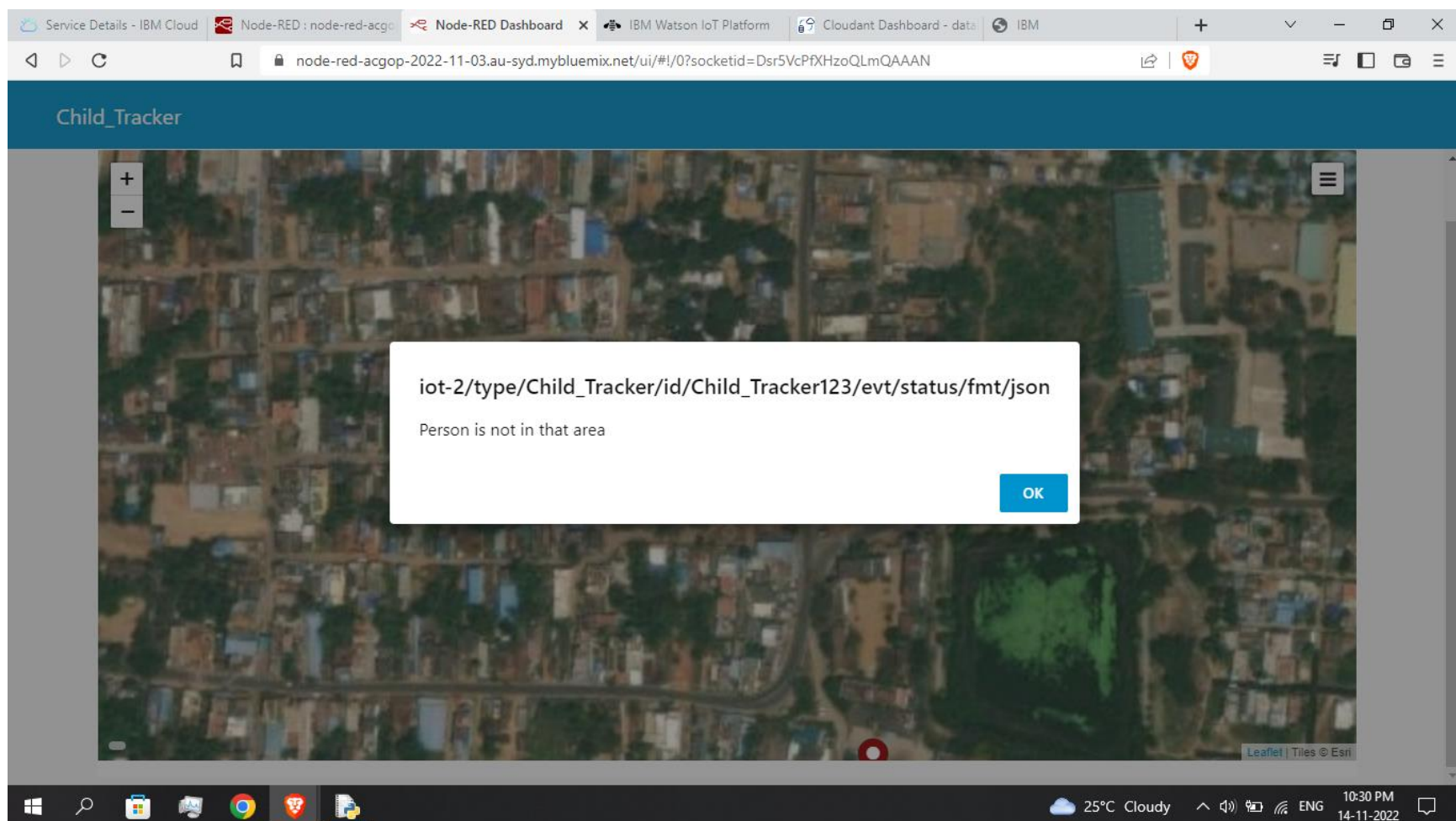

3.Storing the Data in database
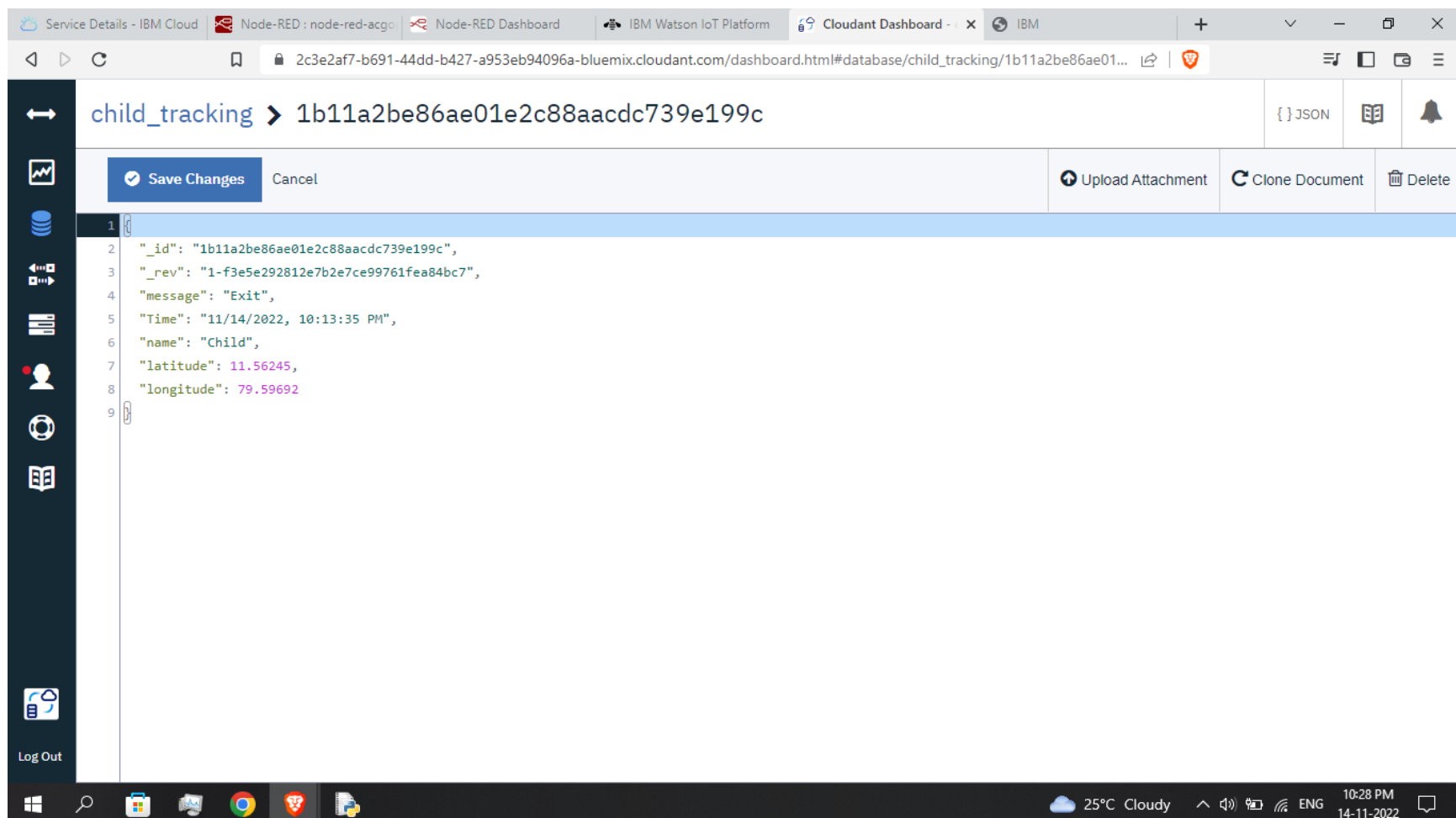
SPRINT-3:

1.Node-Red Connection
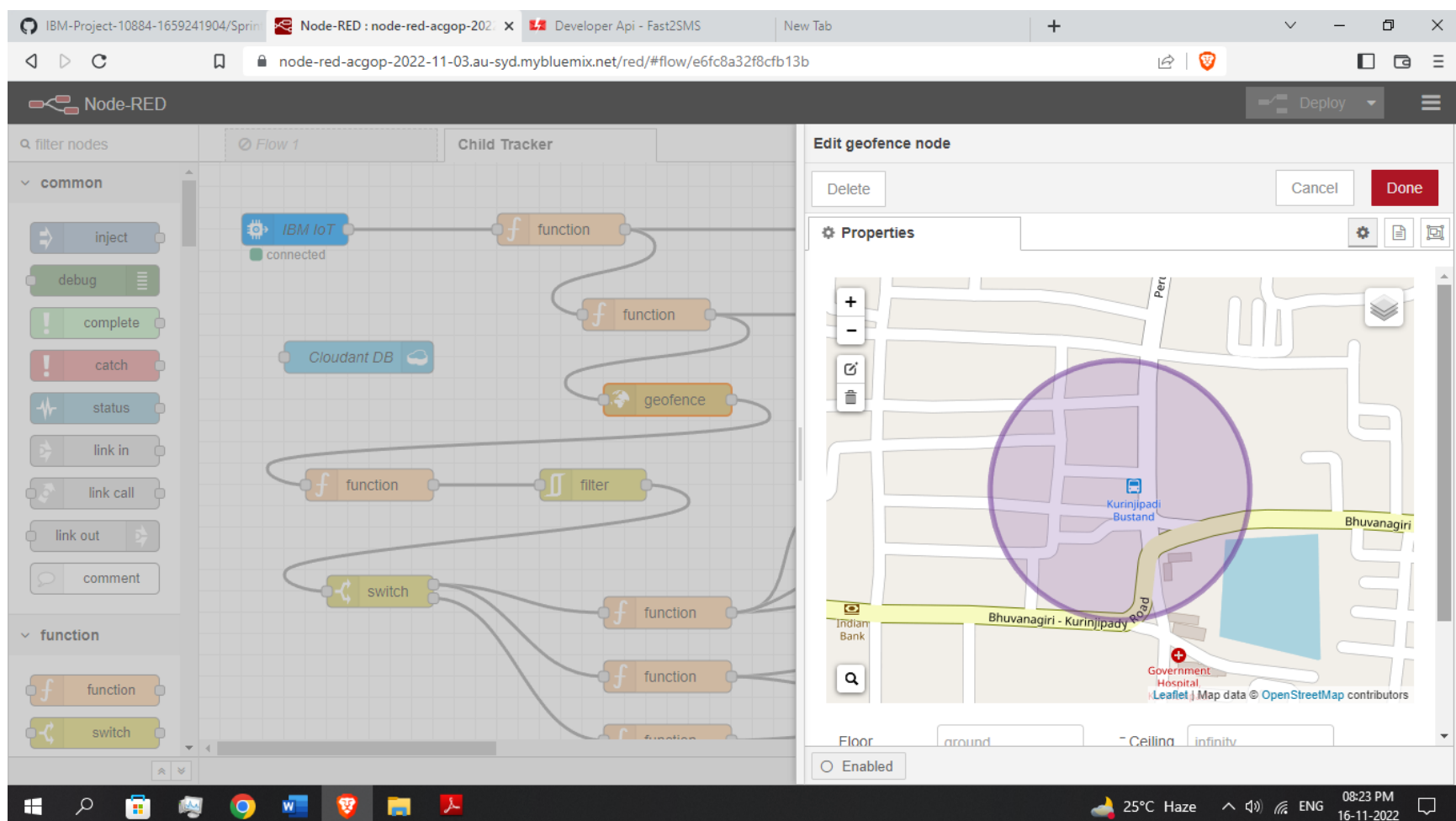

2.Creating a web UI

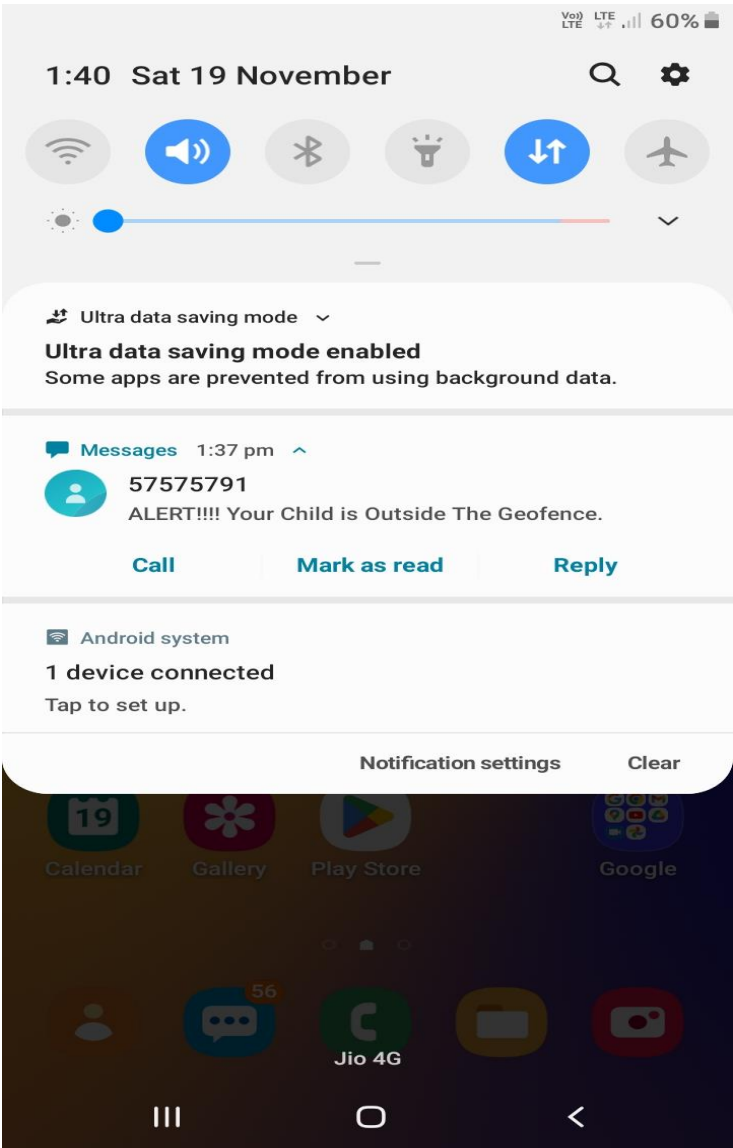## 3.Getting Notification when the child is Outside the Geofence:
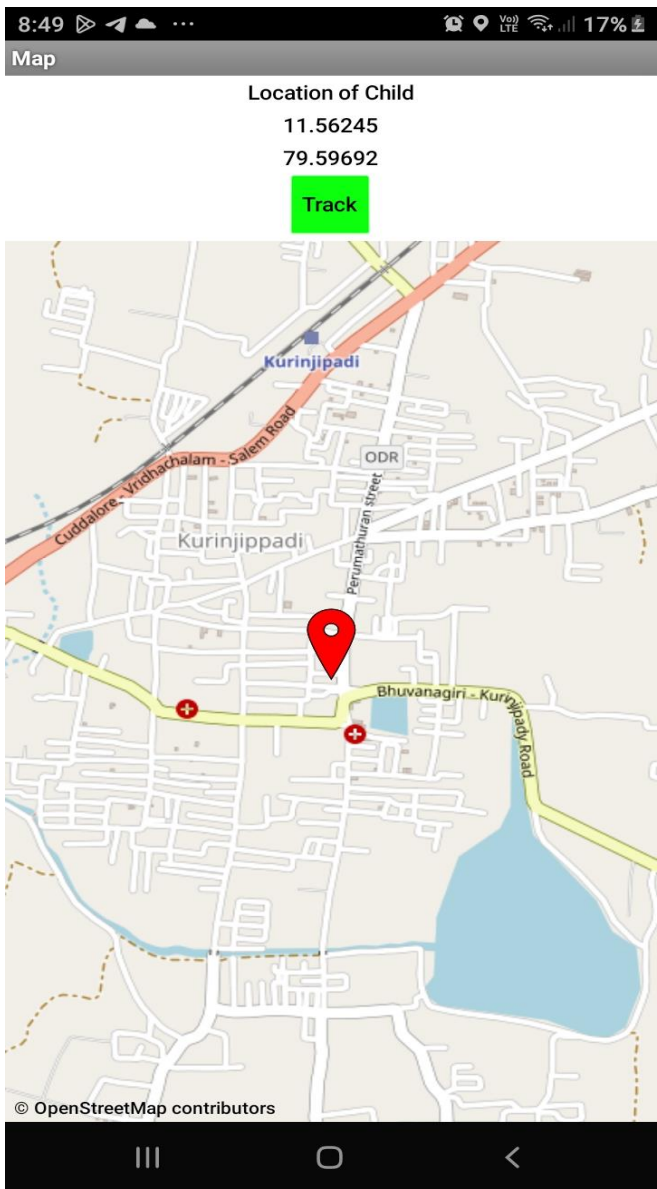

SPRINT-4:

1.Creating the Geofence

2. Getting Notification when the Child is Outside the Geofence

3. Tracking the child using the MIT app

CONCLUSION:

This paper to ensure the safety of children and increase their confidence. Many experimenters are operating in this area and have formulated different technologies to aid children. The key represented in this paper takes the advantage of smartphones which proposes affluent elements like Google maps, SMS, etc. The child safety and protection device is proficient in acting as a smart IoT device. It equips parents with real time location, the surrounding temperature, and along with an alarm buzzer for their child's circumstances and the capability to locate their child. This paper depicts fundamental design concept and functionality along with the anticipated consequences.

REFERENCES:

[1] AnandJatti, MadhviKannan , Alisha RM, Vijayalakshmi P, ShresthaSinha, " Design and Development of an IOT based wearable device forthe Safety and Security of women and girl children ", IEEE International Conference On Recent Trends In Electronics Information Communication Technology, May 20-21, 2016, India.

[2] " RFID-based System for School Children Transportation Safety Enhancement ", Proceedings of the 8th IEEE GCC Conference and Exhibition, Muscat, Oman, 1-4 February 2015.

[3] Pooja.K.Biradar1, Prof S.B.Jamge2," An Innovative Monitoring Application for Child Safety", DOI:10.15680/IJIRSET.2015.0409093.

GITHUB LINK:
https://github.com/IBM-EPBL/IBM-Project-6745-1664170668

DEMO LINK:
https://vimeo.com/772794830